

Patent Application
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WHAT IS CLAIMED IS:

1 1. A method for demodulating data sequences in a
2 multiple access communication system, said method comprising
3 the steps of:

4 configuring a receiver to demodulate using an
5 interference cancellation demodulation scheme selected from
6 any of a plurality of interference cancellation demodulation
7 schemes; and

8 demodulating said data sequences according to said
9 interference cancellation demodulation scheme selected, said
10 demodulating comprising coupling said data sequences to an
11 interference cancellation unit (ICU) at instances based upon
12 the interference cancellation scheme selected.

1 2. The method according to claim 1, wherein said
2 interference cancellation demodulation scheme comprises a
3 successive interference cancellation demodulation scheme, a
4 parallel interference cancellation demodulation scheme, or
5 a hybrid interference cancellation demodulation scheme.

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1 3. The method according to claim 1, wherein said step
2 of demodulating comprises utilizing the same processing
3 elements for any of the selected one of said plurality of
4 interference cancellation modulation schemes.

1 4. The method according to claim 1, wherein said step
2 of configuring further comprises the step of:
3 retrieving at least one parameter enabling said receiver
4 to function according to the interference cancellation
5 demodulation scheme selected.

1 5. The method according to claim 1, further comprising
2 the step of:
3 selectively storing certain demodulated data sequences
4 used in the interference cancellation demodulation for other
5 received data sequences.

1 6. The method according to claim 1, wherein said data
2 sequences are symbol sequences.

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1 7. The method according to claim 1, wherein said step
2 of demodulating is repeated a plurality of times using only
3 ICU within said receiver so as to further cancel interference
4 influencing said data sequences.

1 8. The method according to claim 1, wherein said step
2 of coupling further comprises the step of:
3 generating a control signal for selectively activating
4 a switch disposed between said ICU and said data sequences,
5 said control signal being based upon said interference
6 cancellation demodulation scheme selected.

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1 9. A receiver within a wireless communication system,
2 said receiver comprising:

3 a demodulator for demodulating data sequences appearing
4 at an input of the demodulator using an interference
5 cancellation demodulation scheme selected from any of a
6 plurality of interference cancellation demodulation schemes,
7 said demodulator comprising:

8 an ICU; and

9 a switch, coupled between said ICU and the input, said
10 switch being closed and opened during a demodulation
11 operation based upon the interference cancellation
12 demodulation scheme selected.

1 10. The receiver according to claim 9, wherein said
2 demodulator is configured by at least one parameter
3 associated with said receiver.

1 11. The receiver according to claim 9, wherein said ICU
2 is a single ICU.

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1 12. The receiver according to claim 9, wherein for each
2 data sequence said ICU performs said interference
3 cancellation demodulation a plurality of times so as to
4 further cancel interference influencing said data sequences.

1 13. The receiver according to claim 12, wherein said
2 single ICU performs said selected interference cancellation
3 demodulation for a plurality of users.

1 14. The receiver according to claim 11, wherein the
2 switching time of said switch is controlled by at least one
3 parameter in said demodulator.

1 15. The receiver according to claim 11, wherein said
2 demodulator further comprises:

3 a second switch for selecting one of a plurality of user
4 codes, said one user code selected being provided to said
single ICU during said demodulation operation.

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1 16. The receiver according to claim 9, wherein said
2 interference cancellation demodulation scheme is a successive
3 interference cancellation demodulation scheme, a parallel
4 interference cancellation demodulation scheme, or a hybrid
5 interference cancellation demodulation scheme.

1 17. The receiver according to claim 9, further
2 comprising:

3 a register, coupled between said ICU and said input, for
4 temporarily storing said data sequences.

1 18. The receiver according to claim 9, further
2 comprising:

3 accumulation registers for storing selected demodulated
4 data sequences.

1 19. The receiver according to claim 9, wherein said ICU
2 comprises:

3 a multiplier controlled to perform both despreading and
4 resspreading operations during the demodulation operation.

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1 20. A method for demodulating a data sequence, said
2 method comprising:

3 identifying any one of a plurality of interference
4 cancellation demodulation schemes;

5 loading the data sequence in a first register;

6 transferring the data sequence within the first register
7 to a second register at predetermined time instances based
8 upon the interference cancellation demodulation scheme
9 identified;

10 despread the data sequence in the second register
11 using a user code;

12 respread the despread data sequence;

13 update the first register based upon the respread data
14 sequence; and

15 after said despread, selectively accumulating the
16 despread data sequences in an accumulator, the contents of
17 said accumulator comprising the demodulated data sequences.

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1 21. The method according to claim 20, further
2 comprising:
3 repeating the steps of transferring, despreading,
4 respreading, updating and selectively accumulating, a
5 predetermined number of times.

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1 22. An ICU for demodulating a data sequence, said ICU
2 comprising:

3 a first shift register containing a data sequence, and
4 a second shift register containing at least one code for a
5 user associated with said data sequence; and

6 a multiplier having inputs connected to outputs of said
7 first and said second shift registers, said multiplier
8 multiplying contents of said first and second shift
9 registers, whereby said first shift register, said second
10 shift register and said multiplier are controlled to perform
11 despreadening and respreadding operations.

1 23. The ICU according to claim 22, further comprising:

2 a switch adapted to select an operation performed by
3 said multiplier.

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1 24. The ICU according to claim 22, further comprising:
2 an accumulator for accumulating the despread signal
3 generated by said multiplier, said accumulator connected to
4 the first shift register for supplying the despread signal
5 to said first shift register during a resspreading operation.

1 25. The ICU according to claim 22, wherein said second
2 shift register stores the user specific code used for the
3 despredding operation.

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1 26. An interference cancellation method for canceling
2 the interference on a data sequence, said method comprising
3 the steps of:

4 receiving the data sequence;
5 detecting an estimate of a first spreading code's
6 symbols from said data sequence using an ICU;
7 storing the estimate of said first spreading code's
8 symbols in a first register associated with said first
9 spreading code's symbols; and
10 subtracting a first signal associated with the estimate
11 of said first spreading code's symbols from said data
12 sequence to produce a modified data sequence.

1 27. The interference cancellation method according to
2 claim 26, further comprising, prior to said step of
3 subtracting, the steps of:

4 detecting an estimate of a second spreading code's
5 symbols from said data sequence;
6 storing the estimate of said second spreading code's
7 symbols in a second register associated with said second

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8 spreading code's symbols; and

9 wherein said step of subtracting further comprises
10 subtracting signals associated with the estimate of said
11 first spreading code's symbols and said second spreading
12 code's symbols from said data sequence to produce said
13 modified data sequence.

1 28. The interference cancellation method according to
2 claim 26, further comprising, after said step of subtracting,
3 the steps of:

4 detecting an estimate of a second spreading code's
5 symbols from said data sequence;

6 storing the estimate of said second spreading code's
7 symbols in a second register associated with said second
8 spreading code's symbols; and

9 subtracting a second signal associated with the estimate
10 of said second spreading code's symbols from said modified
11 data sequence.

1 29. The interference cancellation method according to
2 claim 26, further comprising the steps of:

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3 a second detecting step for detecting the estimate of
4 said first spreading code's symbols from said modified data
5 sequence using said ICU;

6 accumulating the estimate of said second detecting step
7 of said first spreading code's symbols to said first register
8 associated with said first spreading code's symbols; and

9 subtracting a third signal associated with the estimate
10 of said second detection of said first spreading code's
11 symbols from said modified data sequence.

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1 30. An interference cancellation system for canceling
2 interference on a data sequence, said system comprising:

3 a first register and a second register for temporarily
4 storing said data sequence;

5 a switch coupled between said first register and said
6 second register for transferring said data sequence from said
7 first register to said second register at predetermined time
8 intervals;

9 an ICU coupled to an output of said second register for
10 receiving the data sequence and detecting estimates of
11 spreading codes' symbols;

12 output registers for storing the estimates of said
13 spreading codes' symbols, each of said output registers being
14 associated with one of said spreading codes' symbols, said
15 output registers being adapted to accumulate subsequent
16 estimates of said spreading codes' symbols; and

17 subtraction means for subtracting signals associated
18 with the estimates of said spreading codes' symbols from said
19 data sequence, thereby removing the influence of the
20 estimates of said spreading codes' symbols from said data
21 sequence.

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1 31. The system according to claim 30, wherein said
2 signals associated with the estimates of said spreading
3 codes' symbols are respread versions of the estimates of said
4 spreading codes' symbols.